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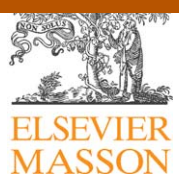

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ORIGINAL ARTICLE

Validation of a French version of the Oxford knee questionnaire

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KEYWORDS
Knee;
Scoring system;
Quality-of-life questionnaire

Summary
Introduction: Self-administered quality-of-life questionnaires are a valuable evaluation tool in orthopedic surgery to determine patient satisfaction. The Oxford knee questionnaire has been validated for osteoarthritic patients. The aim of this study was to validate a French version of this English form. One hundred patients waiting for knee replacement were selected. The answers to the questionnaire were analysed and compared to the clinical and functional International Knee Society score (IKS).
Hypothesis: There is negative correlation between the results of the Oxford knee questionnaire and the IKS score.
Results: None of the patients had difficulty understanding the questions. The mean Oxford knee score was 43.7 (range 21—56, SD 6.9). The distribution was considered normal. There was no floor effect (0%); there was a limited ceiling effect (7%). The internal consistency of the questionnaire was excellent. There was a negative correlation between the Oxford knee score and the IKS knee score, functional score and global score.
Discussion: Our results are very similar to the results from the normative English version of the knee questionnaire and to the results from translated questionnaires in other foreign languages. Our French adaptation of the Oxford knee questionnaire can be used to measure the global function of a patient before knee replacement as accurately as the original English version. It is self-administered, easy to use and patients can send their responses by post, which makes it a useful tool for the routine evaluation of patients before knee replacement.
Level of evidence: Level III, case-control study.

Introduction

The clinical and functional evaluation of patients is essential to control the quality of treatment. In osteoarthritis of the knee, numerous scores have been proposed [1—3].

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At present the most frequently used and validated is the International Knee Society (IKS) score [4], with its clinical and functional components. Nevertheless, it has been shown that these evaluations performed by healthcare personnel, and often by the surgeon, tend to differ significantly from the patient's evaluation, especially after a surgical procedure [5]. Quality of life questionnaires, or ''self administered'' questionnaires, filled out by the patient without input from healthcare personnel, have been shown to be more objective [6], because they correspond more closely to the patient's experience. ''Generic'' questionnaires such as the WOMAC [7] or the SF36 [8], apply to all situations, but are difficult to use in routine clinical practice [9], even the simplified versions [10]. As a result other scores have been developed for specific clinical situations. The Oxford knee questionnaire [11] is an example, which is frequently used in osteoarthritis of the knee.

This questionnaire was initially drafted and validated in English. It was then translated into and validated in different languages [12—15]. To our knowledge, the French version of this score has never been validated. The goal of this paper was to validate this version by comparing the French translation of this questionnaire to the IKS score obtained by the surgical team before total or unicompartmental knee replacement. The hypothesis of this study was the following: there is a negative correlation between the Oxford knee questionnaire and the IKS score.

Material — methods

The Oxford knee questionnaire [11]

This questionnaire was developed by orthopedic surgeons based on a similar questionnaire for the hip [16]. This is a ''self-administered'' questionnaire: the patient must answer the questions without help from the healthcare personnel. There are 12 items on daily life: usual pain, difficulty when bathing and dressing, difficulty in transportation, pain walking, pain getting up, limping, squatting, night pain, pain in activities of daily life, instability, difficulty shopping, difficulty climbing stairs. Each question has five levels of response, from normal function (score 1) to extreme difficulty (score 5). The global score is determined by adding the 12 basic scores. The best score is 12 points, the worst is 60 points. Partial scores have also been defined, for pain (questions 1, 4, 5, 8 and 9) (5—25 points), range of motion (questions 2, 3, 7 and 12) (4 — 20 points) and walking (questions 4, 6, 9, 10 and 11) (5—25 points).

The IKS score [4]

This questionnaire is filled out by healthcare personnel after questioning the patient. It has two basic scores: the clinical score and the functional score, which are each scored between 0 and 100 points, the higher the score, the better the condition of the knee. The clinical score includes four questions with positive points: pain (50 points), flexion (25 points), mediolateral stability (15 points), anteroposterior stability (10 points); and three questions with negative points: malalignment (25 points), flexion contracture (15 points) and extension lag (15 points). The functional score includes two questions with positive points: walking (50 points), climbing stairs (50 points); and one question with negative points: use of a cane or support (20 points).

Study population

Hundred consecutive patients were selected for this study between 2008 and 2009. All patients were scheduled for a total or unicompartmental knee replacement for osteoarthritis of the knee. The age, gender, side, weight, height, body mass index and the presence of other orthopedic disorders that could affect the score were noted.

Methods

The original English questionnaire was translated by a surgeon specialised in orthopedic knee surgery who spoke fluent English.

The French Oxford questionnaire was given to patients during the surgical consultation when the intervention was decided upon, or at the latest, the day before surgery. The patient was informed that s/he should fill out the questionnaire alone, or helped by a family member. The completed questionnaire was turned in when the patient was admitted the day before surgery. One of the members of the surgical team filled out the IKS score questionnaire at this time (knee score, functional score, global score).

All data was entered into an Excel table, then transferred for statistical analysis by specialised software (Statview 9.0, SAS Institute France, Grégy-sur-Yerre, France).

The basic data were studied by classic descriptive statistics (mean, standard deviation, maximum, minimum). Normal distribution was analysed by the Shapiro-Wilk test. The feasibility of the questionnaire was analysed by determining the percentage of patients who were unable to complete it. The presence of a ceiling or floor effect was studied by determining the percentage of responses between the maximum score reduced by one standard deviation (ceiling effect) and the minimum score increased by one standard deviation (floor effect). The internal consistency of the structure of the questionnaire was analysed by calculating the Cronbach alpha coefficient.

The relationship between demographic data and the Oxford score was analysed for qualitative data by the Student t-test and the U Mann-Whitney test, and for quantitative data by calculating the linear correlation coefficient and the Spearman correlation coefficient.

The correlation between the global Oxford score and the IKS score (global score, knee score and functional score) was analysed by calculating the linear correlation coefficient and the Spearman correlation coefficient.

The same analysis was performed for the basic pain questions (questions 1, 4, 5, 8 and 9 of the Oxford questionnaire and the item on pain on the IKS score), range of motion (questions 2, 3, 7, 12 of the Oxford questionnaire and flexion item on the IKS score), walking (questions 4, 6, 9, 10 and11 of the Oxford questionnaire and the item on walking on the IKS score).

A *P*-value of .05 was considered to be significant.

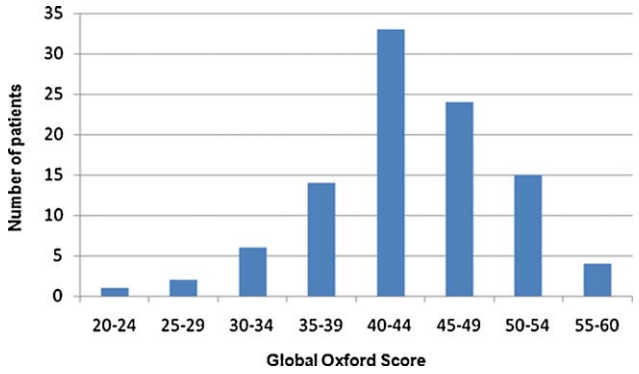

Figure 1 Global Oxford score.

Results

This study included 36 men and 64 women, mean age 69 (range 48—86, SD 9 years). The right side was affected in 50 cases. The mean weight was 83 kg (range 42—144 kg, SD 17 kg). The mean height was 166 cm (range 149—193 cm, SD 9 cm). The mean body mass index was 30.1 kg/m^2 (range 17.3—49.3 kg/m^2, SD 5.3 kg/m^2).

None of the patients had any difficulty understanding the questions. All patients were able to answer the questions, in certain cases with the help of their families.

The mean Oxford score was 43.7 (range 21—56, SD 6.9). The distribution was considered normal ($P = 0.06$). There was no floor effect (no score below 19); there was a slight ceiling effect (7 scores above 53) (Fig. 1). There was no relationship between the Oxford score and age, gender, height, weight, body mass index or the presence of an associated orthopedic disorder. There was a negative correlation between the Oxford score and the IKS knee score (Fig. 2). ($r = -0.33/P = 0.004$), the IKS functional score (Fig. 3) ($r = -0.47/P < 0.001$) and the global IKS score (Fig. 4) ($r = -0.44/P < 0.001$).

The internal consistency of the Oxford questionnaire was excellent, with a Cronbach alpha coefficient of 0.88.

The mean pain score with the Oxford questionnaire was 19.1 (range 10—25, SD 2.9). The distribution was not considered normal ($P = 0.01$). There was no floor effect (no score below 7). There was a ceiling effect (26 scores above 22). There was no relationship between the Oxford score and age, gender, height, weight, body mass index, or the presence of association orthopedic disorders. There was a negative correlation between the pain score of the Oxford questionnaire and the IKS knee score ($P < 0.03$), the functional IKS score ($P < 0.01$), the global IKS score ($P < 0.01$). There was a negative correlation between the pain score on the Oxford questionnaire and the IKS pain score ($P = 0.01$).

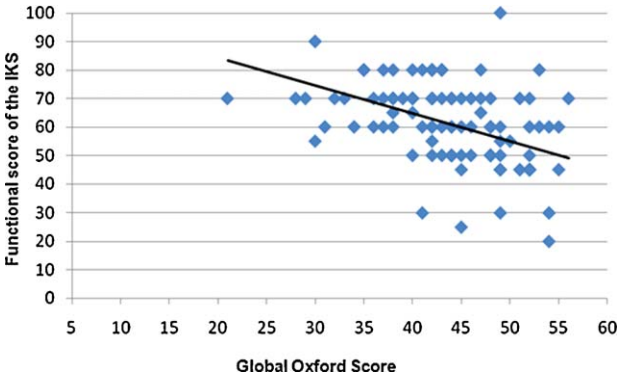

Figure 3 Correlation between the global Oxford score and the functional IKS score.

The mean score for range of motion with the Oxford questionnaire was14.3 (range 6—18, SD 2.3). The distribution was not considered normal ($P < 0.001$). There was no floor effect (1 score below 7). There was no ceiling effect (1 score above 17). There was no relationship between the Oxford score and age, gender, height, weight, body mass index or the presence of any associated orthopedic disorders. There was a negative correlation between the score for range of motion on the Oxford questionnaire and the IKS clinical score ($P = 0.02$), functional score ($P < 0.001$) and global score ($P = 0.003$). There was a negative correlation between the range of motion for range of motion on the Oxford questionnaire and on the IKS score ($P = 0.001$).

Discussion

Although adapting a quality of life questionnaire to a language other than the original language is a potentially complex process, it has been well codified. The methodology of our study is very similar to that in the recent study by Delaunay et al. [17]. However, we deliberately did not

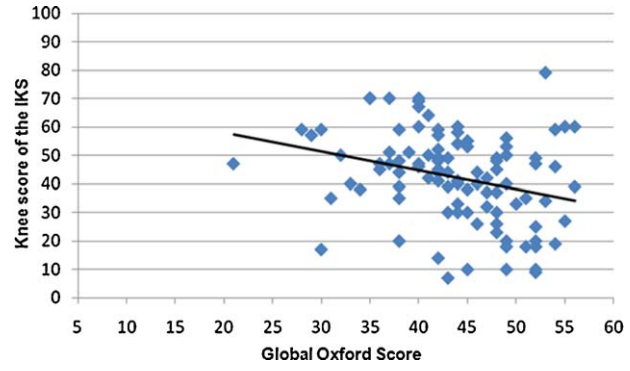

Figure 2 Correlation between the global Oxford score and the clinical IKS score.

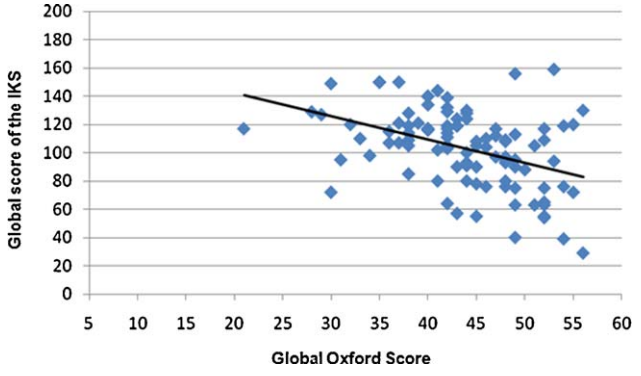

Figure 4 Correlation between the global Oxford score and the global IKS score.

Table 1 Summary of validation studies of the original version and translations of the Oxford questionnaire.

	English [11]	German [14]	Chinese [15]	French	Dutch [13]	Thaï [12]
Feasibility (%)	100	92	100	100		
Consistency (Cronbach) (α)	0.87	0.83	0.81	0.88	0.94	> 0.80
Floor effect (%)		2	0	0		
Ceiling Effect (%)		0	0	0		
Correlation clinical IKS (r)	−0.47	−0.28		−0.33		
Correlation functional IKS (r)	−0.54	−0.57		−0.47		
Correlation total IKS (r)		−0.50		−0.44		

include the unwieldy but internationally recognized process of translation [18].

Indeed this procedure seemed unnecessarily complicated and not at all cost-effective, taking an approach similar to the precautionary principle, which uses extremely complex and difficult procedures to obtain a result that is obvious at the outset. Our translation, which was performed by a bilingual orthopedic surgeon took approximately 30 minutes, which was incomparably less expensive than and certainly bears no relation to the procedure used by Delaunay et al. [17]. Despite this, the results of our study are very similar, both to the results of the index English version of the Oxford score for the knee [11], the results of the procedure for translation of this questionnaire into other languages [12—15], and to the results of the study by Delaunay et al. [17] for a similar questionnaire for the hip (Table 1). This suggests that our translation, even if it was performed with a simpler methodology is perfectly valid. Although certain terms used in our study are slightly different from those used by Delaunay et al. for the hip [17], common sense suggests that the use of the term ''pain that you usually feel (our translation) or «pain that you feel usually»'' (translation Delaunay et al. [17]) will not substantially change patient responses. Moreover Delaunay et al. [17] have suggested that the cultural similarity between English and French patients should make the translation process relatively easy.

Like the original English questionnaire and previously validated questionnaires, we found an excellent internal consistency and a significant correlation between the global Oxford score and the basic scores on one hand, and the IKS score. The negative correlation is merely because both systems are inversed: the best results correspond to the highest values on the IKS score and to the lowest values on the Oxford score. Our results are therefore similar to those of other translation studies [12—15] (Table 1). This shows that our French translation of the Oxford knee questionnaire, like the original English version, is a reliable way to evaluate global knee function in a patient waiting for a knee replacement. This self-administered questionnaire which is easy to use and with answers that can be sent by mail is interesting for large scale evaluations where face to face, long term contact with each patient is often difficult to achieve requiring significant time and energy.

We chose not to validate the reproducibility of this questionnaire. In our opinion the methodology necessary for this is debatable. If the patient is given another questionnaire two or three days after s/he has filled out the initial questionnaire, like Delaunay et al. [17], it is likely that the patient's condition will not have changed but it is also very possible that s/he will have some memory of the questions and answers provided in the first questionnaire. If more time is left between the two questionnaires, there is a risk that the patient's clinical condition significantly change, especially osteoarthritis of the knee, which is a disease which progresses in flare-ups.

The presence of a ceiling effect means that a significant number of patients have a very high score before surgery, with very poor knee function. This also means that any eventual worsening of their condition might not be detected. Luckily, this situation is extremely rare in clinical practice, so this cannot be considered a disadvantage to this approach. On the other hand, the absence of a floor effect confirms that any clinical improvement clinical will be detected by this measurement technique. Nevertheless, this can only be applied to the immediate preoperative period, and it is possible that in the postoperative operative period, improvement in the score could create a floor effect, making evaluation of slight improvements more difficult or even impossible. This is the object of an ongoing study.

Conclusion

The results of our study are very similar, both to the results of the index English version of the Oxford knee score questionnaire and the results of studies on the translation of this questionnaire into different languages. The French translation, like the original English version of the Oxford knee score questionnaire is a reliable way to evaluate global knee function in a patient waiting for knee replacement. It is self administered, easy to use, and responses can be sent by mail, making it an interesting tool for large-scale evaluations.

Conflict of interest

None.

References

[1] Insall JN, Ranawat CS, Aglietti P, Shine J. A comparison of four models of total knee-replacement prostheses. J Bone Joint Surg Am 1976;58:754—65.

[2] Hungerford DS, Kenna RV. Preliminary experience with a total knee prosthesis with porous coating used without cement. Clin Orthop 1983;176:95—102.

[3] Mackinnon J, Young S, Bailey RA. The St Georg sledge for unicompartmental replacement of the knee: a prospective study of 115 cases. J Bone Joint Surg Br 1988;70:217—23.
[4] Insall JN, Dorr LD, Scorr RD, Scott WN. Rationale of the Knee Society clinical rating system. Clin Orthop 1989;248: 13—4.
[5] Wright JG, Rudicel S, Feinstein AR. Ask patients what they want: evaluation of individual complaints before total hip replacement. J Bone Joint Surg Br 1994;76:229—34.
[6] Davies AP. Rating systems for total knee replacement. Knee 2002;9:261—6.
[7] Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. J Rheumatol 1988;15:1833—40.
[8] Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF36). I. Conceptual framework and item selection. Med Care 1992;30:473—83.
[9] Dunbar MJ, Robertsson O, Ryd L, Lidgren L. Appropriate questionnaires for knee arthroplasty. J Bone Joint Surg Br 2001;83:339—44.
[10] Ware JE, Kosinski M, Keller SD. A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. Med Care 1996;34:220—33.
[11] Dawson J, Fitzpatrick R, Murray D, Carr A. Questionnaire on the perceptions of patients about total knee replacement. J Bone Joint Surg Br 1998;80:63—9.
[12] Charoencholvanich K, Pongcharoen B. Oxford knee score and SF-36: translation and reliability for use with total knee arthroplasty patients in Thailand. J Med Assoc Thai 2005;88:1194—202.
[13] Haverkamp D, Breugem SJ, Sierevelt IN, Blankevoort L, van Dijk CN. Translation and validation of the Dutch version of the Oxford 12-item knee questionnaire for knee arthroplasty. Acta Orthop 2005;76:347—52.
[14] Naal FD, Impellizzeri FM, Sieverding M, Loibl M, von Knoch F, Mannion AF, Leunig M, Munzinger U. The 12-item Oxford Knee Score: cross-cultural adaptation into German and assessment of its psychometric properties in patients with osteoarthritis of the knee. Osteoarthritis Cartilage 2009;17:49—52.
[15] Xie F, Li SC, Yeo SJ, Yang KY, Yeo W, Chong HC, Fong KY, Thumboo J. Cross-cultural adaptation and validation of Singapore English and Chinese version of the Oxford Knee Score (OKS) in knee osteoarthritis patients undergoing total knee replacement. Osteoarthritis Cartilage 2007;15:1019—24.
[16] Dawson J, Fitzpatrick R, Carr A, Murray D. Questionnaire on the perceptions of patients about total hip replacement. J Bone Joint Surg Br 1996;78:185—90.
[17] Delaunay C, Epinette JA, Dawson J, Murray D, Jolles BM. Cross-cultural adaptations of the Oxford-12 HIP score to the French speaking population. Orthop Traumatol Surg Res 2009;95:107—16.
[18] Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process cross-cultural adaptation of self-report measures. Spine 2000;25:3186—91.